"BBN"
Frank Heart Interview
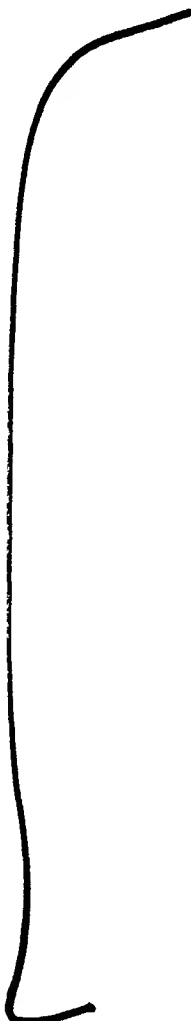August 22, 1994/Tape Number 21
-- CARIBINER GROUP

(OFF MIKE)

QUESTION

Katie had mentioned this whole Tanzania thing ...

if you could just kind of (Overlap)

FRANK HEART

Well ... yeah. I think that, uh, one of the kinds

of things that's clearly going to happen is that,

uh, you're going to be able to get at your ... your

Internet and at your computer from all over the

world. We were in Tanzania a few years ago,

and it was, of course, impossible to make a

phone call. And ... just a very small number of

years, people are going to have cellular phones

that work anywhere in the world. And in turn,

you'll be able to get data over those cellular

phones from anywhere in the world. That's

going to be a very, very big change in the world.

It's ... it's not going to affect the developed

world so very much, because you can now, you

know, get access to your Internet from most

places in ... in the United States. But it's gonna

make a huge change in the undeveloped world ...

in Oceana, and in the undeveloped countries in

Africa and Asia. The fact that there'll suddenly

be communications, and complete access to the

Internet from a random village in China is truly

astounding. I mean, that's gonna be a big

change. It's gonna change the development of

those countries. And, uh, I think that's going to

be important.

QUESTION

Um, what do you think the ... the biggest, most

profound accomplishment of your computer

networking is in the first twenty-five years?

FRANK HEART

Well, I think there's no question that, uh, uh, the

ability to communicate with people differently is

a thing that's happening. Anything which really

changes how people communicate and take

advantage of the past is a big deal. I mean,

printing was a big deal. Television, uh, has been

a big deal. The fact that people can now better

take advantage of what's gone before by getting

access to big databases over the Internet, and

the fact that they can intercommunicate with

each other better with E-mail and other access to

data bases is a big change. That's a ... that's a

social change that's important. Anything which

really is a big change in how people

intercommunicate is a big deal. So that's

certainly the ... the biggest change. I mean, it's

certainly not being able to get access to ... to

some other program in some other computer.

It's ... it's being able to get access to the world

... and information to other people in a better and

different way than reading a book or watching

television.

QUESTION

Uh, other than what you had said before ...

which I will ask you which is, so you know, why

was it a success ... is there anything else that

could be part of this evening ... the night of the

tenth(?), that I haven't asked you? Is there

anything that you would like to reflect on or, uh

...

QUESTION

Can I ask you a question? Um, one thing that

might be good to get in is, uh, you know, when

they ... when you first got the RFP and saw the

structure of it ... did you think ... did you agree

with it? Did you think formularies(?) was a good

idea? Did you ... did you have, you know, an

opinion? Did it seem like a really, um, smart

design?

FRANK HEART

Well, I ... I think that we obviously had realized

that Arthur had done a great deal of work before

the they issued the RFP. So certain things were

a given. And we didn't spend a lot of time ...

since there wasn't a lot of time ... trying to

imagine how it might have been done some

different way. Uh, we took what was given and

worked from there. It turned out there was a

tremendous amount to be invented. I mean,

Arthur had only really specified the general

nature of the thing. And so we had plenty to do.

And so I think that, uh, the answer is we really

... we really didn't try to reinvent how else it

might have been done, we tried to build on what

they'd done. Uh, but that left a lot of room for

invention. And, uh, how the IMPs were to

communicate ... you know, for example, one of

the things that was wonderful about the project

... many people who work on a communication

project have to make it backward compatible to a

whole bunch of other junk which is lying around.

We had the privilege of being able to start the NOVA and ... and invent how the IMPs were going to communicate with each other. And ... and invent how the IMPs were going to communicate with the hosts. And that was a degree of freedom that most people who build communications systems are not, uh, blessed with. So that was certainly an interesting difference, and it ... it was also an interesting technical challenge for people. I think I would like to take a minute and talk abut, uh, why the project was successful. I think that for people who are involved in government projects, uh, they probably know that a very large number of them manage not to be so successful. They manage to either be, uh, late or badly overrun, or not work at all, or ... or other things. And so it's somewhat important to notice why something does work so well and ... and the ARPANET project, I think everybody would agree has been

a smashing success. And so I think it's

interesting to ask why that is. And, um, maybe I

could just list a few things that I think are

important there. First of all, at BBN we had a

very small, very, very talented group. Uh,

there's a big distinction in trying to get twelve

people to work together when everybody can

know everything and all the software people can

know about hardware, and all the hardware

people are programmers ... that's a very different

situation than a project with hundreds of people

where there's a great partition of labor and

where, uh, it's very, very difficult to get to know

what everybody else is doing. So that was one

thing. Uh, small talented groups. If you can

manage to collect a small talented group, that's

the way to get a ... get a good project going. I

think a second thing was we had a very

enlightened, intelligent client ... both individually

in the form of Larry Roberts, and institutionally in

the form of ARPA. Although ARPA's a good

organization even today and is one of the better

government contracting groups. In those days,

ARPA was even faster on its feet and had even

greater freedom to ... to do what it wanted. And

so, uh, it was possible for ARPA to move very

rapidly. I'm not positive that the ARPANET

project could be done on the same schedule

today. I think that, uh, there's been enough

difficulty with government contracting ... and

this is not a unique conclusion of mine ... I think

that very high levels in the administration are

trying to work on procurement reform because

it's gotten so unwieldy. And ... and, uh, so

procurement's a problem for the government.

And in the ARPANET project, it was done as I

say, in a very intelligent way by very intelligent

people. Also, Larry Roberts had another lucky

thing going for him. He not only was supplying

the money for building the network, but he was

supplying all the money to the users of the
network. So he was able to, uh, strongly
encourage cooperation between the network
builders and the network users. That's again, an
unusual situation. Uh, since ARPA was proving
a research support to those organizations as well
as the, uh, you know, the support for the, uh, for
the network builders at BBN and others. I think
the third thing was that even though it was a
government project, and even though it was a
DOD project, it was amazingly free of some of
the kinds of troubles that ... that ... uh, dog
other projects. For example, it was completely
unclassified. A second thing was that the
network was provided to its users as a free good
... I mean, it was ... there was no cost
associated with people using the network. That
meant they didn't have to ask themselves, "Oh,
is it worth it?" "Should I put up the money to
use the network?" They were able just to use it

and learn about it and experiment with it at no
cost. And, uh, and then third, again, even
though it was DOD, it was free of access
constraints. Nobody really worried that some
student was on the thing. Nobody said, "Well, it
can only be people with ... with certain kinds of
permissions" ... access control was not required
at the beginning. And even to this day, I mean,
the Internet has ... has been reported in the
press, uh, people all over the world are using it
and it's very, very open and, um, I think that that
... that was based on a beginning, uh, plan to
have it available without access controls ... that
made a big difference. And then there was the
effort made to make it reliable. I think that, uh,
it ... it was ... it was able to withstand being in
places where there were students who, uh, loved
... would have loved to drop screwdrivers into it,
or to try to use it for other purposes and, uh, it
was ... it was built to be resistant to those kinds

of attacks, and resistant to having ... it had not

buttons anybody had to push. So therefore, it

was hard to push the wrong ones. Uh, the

reliability efforts were very important. Uh, so I

think that those kinds of things make a big

difference in the success of projects, and it

would be nice if more projects could be run with,

uh, some of those attributes.

QUESTION

Great. Uh, why don't we just stop for a second.

(CUT)

QUESTION

First question, it's just kind of an aside ...

(OFF MIKE)

QUESTION

JCR ... what kind of guy was he?

FRANK HEART

Well, he was very important to ... to this ...

sorry. Um, there's obviously certain people

who've been in the background of ... of the

ARPANET who had ideas that were ... and who did things that were not maybe directly involved in building the ARPANET, but which made a huge difference. Once such person was ... was Licklighter(?). Uh, Licklighter was responsible for setting up the ARPA office, uh, which ended up, uh, supporting the ARPANET project. There was no IPTO office prior to Licklighter's going to ARPA. So, he really produced the ... the support organization which was in a position to build the network. And there really ... I don't believe there were others ... so, uh, that was obviously pretty critical. I think also he was very, very, uh, prescient in thinking through the ideas of how people might interact with computers and he ... he had a number of ideas about networking and ... and people networking and computer networking that were, uh, very, very innovative thinking at the time. And while they didn't lead directly, uh, you know, to the network, they

were ... they were very important backdrops.

And there were other people like Englebart(?)

who, uh, who also had, uh, some very early

involvement with thinking about how people

interact with computers ... that made a

difference in how the network developed over

time. So certain people like Licklighter and

Englebart were important backdrop, uh, figures.

And Licklighter, in particular, as I say, because of

his activities at ARPA ... uh, without him it

probably wouldn't have happened ... at least not

in the same time or in the same schedule. It just

wouldn't have occurred. I think ... you

know,another thing to say about, uh, the way

the project proceeded ... this is more along the

lines of the other people involved besides the

groups at BBN ... we were really lucky in that we

were working with the cream of the computer

science community. I mean, ARPA in those days

was supporting the very best organizations

around the country who were working on

computer science. And therefore, the early sites

... in fact some of the later sites ... were

populated by wonderful, wonderful people. And

very strong people who ... who, uh, were in a

position to work closely with groups like BBN.

And for whom it was a pleasure to work with.

And again, I don't think the network could have

been developed on the same schedule had not

the people at the sites been of the quality level

and, uh, that they were. So it was, uh, it was

definitely a project that was being run, uh, with

the cream of the computer crop in the United

States at that time. And that was obviously a

major factor in how well it went.

QUESTION

I ... I ... I can't think of much else. I know there

are some great things here.

(OFF MIKE)

(END OF TAPE #21)